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ABSTRACT

This report described a feasibility study designed to investigate the utility of interactive videodisc technology in testing preschool children. Computer assisted testing permits test administration with minimal training for personnel, high quality control in administration procedures, and immediate scoring and feedback. The combination of an optical laser videodisc with a computer could provide additional, more versatile storage and branching capacities; rapid, random access to still frames and motion segments; and high quality visual display. The preschool children in the study responded well to the video presentations. They enjoyed the testing situation and seemed more interested, and less stressed, than they had been with human test administrators. (DWH)

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DEVELOPING COMPUTERIZED ASSESSMENT FOR YOUNG CHILDREN [1]

Martha B. Bronson

The small study I want to describe to you today was really a feasibility study designed to see whether interactive videodisc technology could be useful in testing children of preschool and kindergarten ages. Mediax Associates of Westport, Connecticut had been the primary contractor for a federal government (ACYF) project which had the goal of developing new assessment instruments for Head Start over a five year period. At the conclusion of the project, Mediax decided to continue the test development effort in a new way. The measures developed during the project period, by Mediax and several academic subcontracting agencies, had proved promising in a number of areas but there were certain problems with use of the instruments in the field. Though the tests were designed to be administered by paraprofessionals, there were still some of the difficulties common to all testing efforts. These included:

1 - finding testors and the necessary time to train them,

2 - adequately training the testors at low cost to the centers,

3 - standardizing the test administration procedures over different sites and different parts of the country,

4 - finding time to complete the assessments, and

5 - quickly scoring the tests for feedback to the centers.

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Computer technology addresses these difficulties very well. With computers, tests can be administered with minimal training for center personel, high quality control in administration procedures, and virtually immediate scoring and feedback for the centers. Additional possible benefits include:

- using the computer's branching capacity to investigate errors and item difficulty,
- using branching to individualize testing (thus minimizing presentation of nonrelevant test items) and
- using the computer's storage and analysis capacity for item and data bank maintenance.

Combining an optical laser videodisc with the computer could provide:

- additional and more versatile storage and branching capacities,
- rapid, random access to still frames and motion segments, and
- high quality visual display, which might be especially important for use with young children.

It was not known whether children as young as three, four and five years of age would respond at all to test items presented by, what to them would be, a television screen. It seemed probable that children of these ages could respond more easily, and would therefore be more likely to respond, if they could touch the screen with their fingers or a light pen rather than having to manipulate keys or a joy stick. We placed a television screen in a table so children could easily see and touch it.

Show table with screen

Test items were presented by "Goldiebear," a person-sized bear figure with a female voice. Goldiebear was introduced in a brief film segment in which she fed animals at a zoo and talked to the camera (i.e. to the child taking the test).

Show some intro with no sound

An experimenter stayed in the room with the child during this brief introduction, then left, so that the child was alone with the screen. It is important to note that children usually did not object to this, and that most then sat for 20 minutes to 1/2 hour alone with the screen doing the test items. Sets of items were introduced as special "games" the child could play, and "reward" sequences such as the following were inserted after every few items, regardless of the correctness of the child's performance.

Show several reward clips

We later tried replacing the visual rewards with simple verbal comments such as "good work," "great," "wonderful," or "very good" in the bear's voice (again regardless of the correctness of the child's performance) and this seemed just as effective. We also showed child models demonstrating appropriate behaviors in several more complex test situations so we were sure the child knew what was expected.

Show a Lucie & Paul demo clip

We presented test items on the screen very much as they had been presented by testers in the field so we could compare children's responses in the new situation with the large body of data from the test development project.

We have tested only 52 three, four, and five-year-old children so far, but the results have been so consistant and interesting that they seemed worth sharing. We videotaped many of the children as they were taking the test items, so you can see some illustrations of the points I will be making.

I should note at the outset that I was initially skeptical of the feasibility of testing young children with a machine. It seemed inhuman somehow, and possibly violating. To my great surprise, the exact opposite appeared to be the case. We had previously filmed a number of children being tested by adults in the usual way, and these often appeared shy, worried, threatened, or even fearful. In the video situation, almost all the children appeared to enjoy the testing. Note a typical reaction in the behavior of this boy, age 3 1/2 to the introduction of Goldiebear,

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Show child watching introduction: he waves, says "hi", talks to screen

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this friendly response of a 4 year old girl to the bear,

Show child talking to Goldiebear: she says "Goldiebear, you know what?" etc.

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and these responses of 5 and 3 year old girls.

Show four following clips:
- reward sequence -"you're a honey"+ girl clapping
- intake of breath at pumpkin intro
- laughing & imitation of reward horn
- did you have fun ques. - "YES"

When the screen was momentarily blank (while the tape was changed) two 4 year olds remained confident that the bear could still see and hear them.

Show two following clips:
- calls "hello" to screen
- says "bet he can hear me"

This is not to say that there were no negative reactions. Two very young three year olds initially responded this way:

Show two following clips:
- girl turns away & says "I want my mommie"
- boy says "I don't want to"

When their mothers were allowed to sit with them these children relaxed and began to respond and enjoy the situation.

Another interesting feature of the machine administered testing was that the children appeared to find it non-judgemental and non-threatening. They did not seem as upset by making errors

as they had in the adult-administered testing. Some children continued to try as if they were not aware of making errors.

Show two following clips:
- in "what word left," girl responds:
  (cow)boy - "k"
  (base)ball - "base"
- in perspective item (block is red & white), guesses:
  "pink" to one &
  "white & purple" to another

(all done cheerfully & with continued motivation)

Other children stated matter-of-factly that they did not know the answer.

Show three following clips:
- asked phone # - "I don't know"
- asked perspective block - "I don't know"
- asked first sound of even - "I don't know goldilocks"

Another reaction to not knowing an answer was not to respond at all.

Show following clip:
- strip match ques. - no response & draws back

This reaction was common in the adult administered testing as well, but was usually accompanied by signs of embarrassment which almost never occurred in the video situation.

The machine obviously did not correct children for squirming in their seats. Interestingly, though many did this, it usually did not appear to interfere with their performance.

Show two following clips:
- kneels up in chair but answers correctly
- leans over chair & looks under table but answers correctly

Children were interested in and able to respond to a number of different types of items administered via the video screen. I will show you a selection of types of items with children responding to them, so you can get a sense of the range of things we have tried and that seemed to "work."

Here are five and three-year-old children responding to "perception" items:

Show two following clips:
- strip match - correct
- length match from memory - "I know" & does correctly

Here are three, four, and five-year-old children responding to math items:

Show three following clips:
- counts 4 buttons correctly
- identifies two groups as equal
- identifies which group has more

Here are children three and five doing Piagetian conservation and perspective items:

Show two following clips:
- one to one correspondence - correct
- perspective block - correct

Here is a three and a half-year-old boy doing some class inclusion items:

Show two following clips:
- touch the one that doesn't belong
  & tell why
- tell which one is not alive

Here are some children, ages four and five, responding to items which involve linguistic concepts:

Show three following clips:
- before & after (touch objects)-
  not correct
- show object (toy man) that is the same
- big vs. "bigger" elephant

Here are three and four-year-old children responding to other types of language items:

Show three following clips:
- show understanding of sentence
- describe cat (shown)
- give implications of short story

And here, finally, are three, four, and five-year-old children responding to pre-reading and reading items:

Show eight following clips:
- match capitals & lower case letters
- find rhyming pictures - spoon & moon
- tell first sound in "open"
- name letter pointed to on page of print
- name missing sound in "cup" - "_up"
- find named letter on page of letters
- produce rhyme for man, pan.....
- if take the word "school" away from word "schoolroom" - what is left

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Generally, children responded to the video presentations much as they had responded to the human testors except that:

1 - they obviously enjoyed the situation much more,

2 - they appeared to be more interested in the various items and more able to concentrate (though the items were not presented in a strikingly different way), and

3 - they seemed less stressed when they made errors and more able to continue cheerfully and with high motivation.

The few children who had any problems with the situation at all were under three and a half, and these usually responded well if allowed to have their mothers present. As I noted above, I was particularly impressed with the humaneness of the situation, and, though unexpected, this may be the most important result obtained from the testing so far.

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